SECTION 303 – THERMOPLASTIC PIPE

1. DESCRIPTION

This work shall consist of furnishing and installing thermoplastic pipe in conformance with these specifications, any special provisions, and the details shown on the plans.

2. WORKMANSHIP AND INSPECTION

All thermoplastic pipe materials shall conform to the workmanship and inspection requirements of AASHTO M278, M294, or M304; or ASTM F679, F714, or F894 as applicable.

3. WORKING DRAWINGS

Whenever specified or requested by the Engineer, the Contractor shall provide manufacturer's installation instructions or working drawings with supporting data in sufficient detail to permit structural review. Sufficient copies shall be furnished to meet the needs of the Engineer and other entities with review review authority. The working drawings shall be submitted sufficiently in advance of proposed installation and use to allow for their review, revision, if needed, and approval without delay of the work. The contractor shall not start construction of any thermoplastic pipe installations for which working drawings are required until the drawings have been approved by the Engineer. Such approval will not relieve the Contractor of responsibility for results obtained by use of these drawings or any of the other responsibilities under the contract.

4. MATERIALS

A. Thermoplastic Pipe

1. Polyethylene pipe shall conform to the requirements of AASHTO M294, or ASTM F714 or ASTM F894.

2. Poly(Vinyl Chloride) (PVC) pipe shall conform to the requirements of AASHTO M278, AASHTO M304, or ASTM F679.

B. Bedding Material and Structural Backfill

1. Bedding and structrual backfill shall meet the requirements of AASHTO M145, A-1, A-2-4, A-2-5, or A-3. Bedding material shall be 1.25" maximum granular material. Backfill for thermoplastic pipe shall be granular material and shall be free of organic material, stones larger than 1.5 inch in greatest dimension, or frozen lumps. Moisture content shall be in the range of optimum (typically –3% to +2%) permitting thorough compaction. Consideration should be given to the potential for migration of fines from adjacent materials into open-graded backfill and bedding materials.

For pipe types that are not smooth on the outside (corrugated or profile walls), backfill gradations should be selected that will permit the filling of the corrugation or profile valleys.

Controlled low strength mortar (CLSM) (or controlled density fill (CDF)) may

be used for backfill and bedding provided adequate flotation resistance can be achieved by restraints, weighting, or placement technique. With CLSM backfill, trench width can be reduced to a minimum of the outside diameter plus 12 inches. When CLSM is used all joints shall have gaskets.

5. ASSEMBLY

A. General. Thermoplastic pipe shall be assembled in accordance with the manufacturer's instructions. All pipe shall be unloaded and handled with reasonable care. Pipe shall not be rolled or dragged over gravel or rock and shall be prevented from striking rock or other hard objects during placement in trench or on bedding. Thermoplastic pipe shall be placed in the bed starting at the downstream end.

B. Joints. Joints for thermoplastic pipe shall meet the following performance requirements.

C. Field Joints. Joints shall be so installed that the connection of pipe sections will form a Continuous line free from irregularities in the flow line. Suitable field joints can be obtained with the following types of connections:

1. Corrugated bands (with or without gaskets)
2. Bell and spigot pipe ends (with or without gaskets)
3. Double bell couplings (with or without gaskets)

6. INSTALLATION

A. General Installation Requirements. Trenches must be excavated in such a manner as to insure that the sides will be stable under all working conditions. Trench walls shall be sloped or supported in conformance with all standards of safety. Only as much trench as can be safely maintained shall be opened. All trenches shall be backfilled as soon as practicable, but not later than the end of each working day.

B. Trench Widths. Trench width shall be sufficient to ensure working room to properly and safely place and compact haunching and other backfill materials. The space between the pipe and trench wall must be wider than the compaction equipment used in the pipe zone. Minimum trench width shall not be less than 1.5 times the pipe outside diameter plus 12 inches (300mm). Trench width in unsupported, unstable soils will depend on the size of the pipe, the stiffness of the backfill and insitu soil, and the depth of cover. The trench shall be excavated to the width, depth, and grade as indicated on the plans and/or given by the engineer.

C. Foundation and Bedding. Foundation and bedding shall meet the requirements of Article 4.B and shall be installed as required by the engineer according to conditions in the trench bottom. A stable and uniform bedding shall be provided for the pipe and any protruding features of its joint and/or fittings. The middle of the bedding equal to 1/3rd the pipe O.D. may be loosely placed while the remainder shall be compacted to a minimum 90% of Maximum density per AASHTO T99. A minimum of 4 inches of bedding shall be provided prior to placement of the pipe unless otherwise specified.

When rock or unyielding material is present in the trench bottom, a cushion of bedding of 6 inches minimum thickness shall be provided below the bottom of the pipe.

When the trench bottom is unstable, material shall be excavated to a depth as required by the Engineer and replaced with a suitable foundation. A suitably graded material shall be used where conditions may cause migration of fines and loss of pipe support.

D. Structural Backfill. Structural backfill shall meet the requirements of Article 4.B. Structural backfill shall be placed and compacted in layers not exceeding an 8 inch loose lift thickness and brought up evenly and simultaneously on both sides of the pipe to an elevation not less than one foot above the top of the pipe. Structural backfill must be worked into the haunch area and compacted by hand.

A minimum compaction level of 90% standard density per AASHTO T 99 shall be achieved. Special Compaction means may be necessary in the haunch area. All compaction equipment used within 3 feet of the pipe shall be approved by the engineer. Ponding or jetting the structural backfill to achieve compaction shall not be permitted without written permission from the engineer.

Backfill materials more than one foot above the pipe to final grade shall be selected, placed, and compacted to satisfy the loading, pavement, and other requirements above the pipe.

E. Minimum Cover. A minimum depth of cover above the pipe should be maintained before allowing vehicles or heavy construction equipment to traverse the pipe trench. The minimum depth of cover should be established by the Engineer based on an evaluation of specific project conditions. For embedment materials installed to the minimum density given in Article 6D, cover of at least 24 inches shall be provided before allowing vehicles or construction equipment to cross the trench surface. Hydrohammer type compactors shall not be used over the pipe.

7. MEASUREMENT

Pipe installations shall be measured in linear feet installed in place, completed, and accepted. The number of feet shall be the centerline lengths of the pipe.